

SEQUENCE LISTING

<110> Boehringer Ingelheim (Canada) Ltd.

<120> Purified Active HCV NS2/3 Protease

<130> 13/082

<150> 60/256,031

<151> 2000-12-15

<160> 21

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1230

<212> DNA

<213> HCV

<220>

<221> CDS

<222> (1)...(1230)

<400> 1

atg gac cgg gag atg gct gca tcg tgc gga ggc gcg gtt ttc ata ggt	48
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1 5 10 15	
ctt gca ctc ttg acc ttg tca cca tac tat aaa gtg ctc ctc gct agg	96
Leu Ala Leu Leu Thr Leu Ser Pro Tyr Tyr Lys Val Leu Leu Ala Arg	
20 25 30	
ctc ata tgg tgg tta cag tat tta atc acc aga gtc gag gcg cac ttg	144
Leu Ile Trp Trp Leu Gln Tyr Leu Ile Thr Arg Val Glu Ala His Leu	
35 40 45	
caa gtg tgg atc ccc cct ctc aat gtt cgg gga ggc cgc gat gcc atc	192
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Ile	
50 55 60	
atc ctc ctc acg tgc gca gtc cac cca gag cta atc ttt gac atc acc	240
Ile Leu Leu Thr Cys Ala Val His Pro Glu Leu Ile Phe Asp Ile Thr	
65 70 75 80	
aaa ctc ctg ctc gcc ata ttc ggt ccg ctc atg gtg ctc cag gca ggc	288
Lys Leu Leu Leu Ala Ile Phe Gly Pro Leu Met Val Leu Gln Ala Gly	
85 90 95	
ata acc aaa gtg ccg tac ttc gtg cgt gcg cag ggg ctc att cgt gcg	336
Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile Arg Ala	
100 105 110	
tgt atg ttg gtg cgg aag gct gcg ggg ggt cat tat gtc caa atg gcc	384
Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln Met Ala	
115 120 125	

ttc atg aag cta gct gcg ctg aca ggt acg tac gtt tat gac cat ctc	432
Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu	
130 135 140	
act cca ttg cag gat tgg gcc cac gcg ggc cta cga gac ctt gca gtg	480
Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val	
145 150 155 160	
gcg gta gag ccc gtc atc ttc tct gac atg gag gtc aag atc atc acc	528
Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile Ile Thr	
165 170 175	
tgg ggg gcg gac acc gcg gca tgc ggg gac atc att tca ggt ctg ccc	576
Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly Leu Pro	
180 185 190	
gtc tcc gct cga agg gga agg gag ata ctc ctg gga ccg gcc gat aat	624
Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala Asp Asn	
195 200 205	
ttt gaa ggg cag ggg tgg cga ctc ctt gcg ccc atc acg gcc tac tcc	672
Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser	
210 215 220	
caa cag aca cgg ggc cta ctt ggt tgc atc atc acc agc ctc aca ggc	720
Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly	
225 230 235 240	
cgg gac aag aac cag gtc gag ggg gag gtt caa gtg gtc tcc acc gct	768
Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala	
245 250 255	
aca caa tct ttc ctg gcg acc tgc gtc aac ggc gtg tgt tgg act gtc	816
Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val	
260 265 270	
ttc cat ggc gcc ggc tca aag acc ttg gcc ggc ccc aaa ggc cca atc	864
Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile	
275 280 285	
acc cag atg tac act aat gtg gac cag gac ctc gtc ggc tgg cag gcg	912
Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala	
290 295 300	
ccc cct ggg gcg cgc tcc atg aca cca tgc acc tgc ggc agc tcg gac	960
Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser Ser Asp	
305 310 315 320	
ctc tat ttg gtc acg aga cat gcc gac gtc att ccg gtg cgc cgg cgg	1008
Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg	
325 330 335	
ggc gac agt agg ggg agc ctg ctc tcc ccc agg cct gtc tcc tac ttg	1056
Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu	
340 345 350	

Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile
 275 280 285
 Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala
 290 295 300
 Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser Ser Asp
 305 310 315 320
 Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg
 325 330 335
 Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu
 340 345 350
 Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val
 355 360 365
 Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val
 370 375 380
 Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg Thr Ser Ser
 385 390 395 400
 Ala Trp Arg His Pro Gln Phe Gly Gly
 405

<210> 3
 <211> 1011
 <212> DNA
 <213> HCV
 <220>
 <221> CDS
 <222> (1)...(1005)

<400> 3
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 ggc ata acc aaa gtg ccg tac ttc gtg cgt gcg cag ggg ctc att cgt 96
 Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile Arg
 20 25 30
 gcg tgt atg ttg gtg cgg aag gct gcg ggg ggt cat tat gtc caa atg 144
 Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln Met
 35 40 45
 gcc ttc atg aag cta gct gcg ctg aca ggt acg tac gtt tat gac cat 192
 Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His
 50 55 60
 ctc act cca ttg cag gat tgg gcc cac gcg ggc cta cga gac ctt gca 240
 Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala
 65 70 75 80
 gtg gcg gta gag ccc gtc atc ttc tct gac atg gag gtc aag atc atc 288
 Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile Ile
 85 90 95
 acc tgg ggg gcg gac acc gcg gca tgc ggg gac atc att tca ggt ctg 336
 Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly Leu
 100 105 110

ccc gtc tcc gct cga agg gga agg gag ata ctc ctg gga ccg gcc gat	384
Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala Asp	
115 120 125	
aat ttt gaa ggg cag ggg tgg cga ctc ctt gcg ccc atc acg gcc tac	432
Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr	
130 135 140	
tcc caa cag aca cgg ggc cta ctt ggt tgc atc atc acc agc ctc aca	480
Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr	
145 150 155 160	
ggc cgg gac aag aac cag gtc gag ggg gag gtt caa gtg gtc tcc acc	528
Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr	
165 170 175	
gct aca caa tct ttc ctg gcg acc tgc gtc aac ggc gtg tgt tgg act	576
Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr	
180 185 190	
gtc ttc cat ggc gcc ggc tca aag acc ttg gcc ggc ccc aaa ggc cca	624
Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro	
195 200 205	
atc acc cag atg tac act aat gtg gac cag gac ctc gtc ggc tgg cag	672
Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Val Gly Trp Gln	
210 215 220	
gcg ccc cct ggg gcg cgc tcc atg aca cca tgc acc tgc ggc agc tcg	720
Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser	
225 230 235 240	
gac ctc tat ttg gtc acg aga cat gcc gac gtc att ccg gtg cgc cgg	768
Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg	
245 250 255	
cgg ggc gac agt agg ggg agc ctg ctc tcc ccc agg cct gtc tcc tac	816
Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr	
260 265 270	
ttg aag ggc tct tcg ggt ggc cca ctg ctc tgc cct tcg ggg cac gct	864
Leu Lys Gly Ser Ser Gly Gly Ala Val Leu Leu Cys Pro Ser Gly His Ala	
275 280 285	
gtg ggc atc ttc cgg gct gct gtg tgc acc cgg ggg gtt gca aaa gcg	912
Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala	
290 295 300	
gtg gac ttc ata cct gtt gag tct atg gaa act acc atg cgg act agt	960
Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg Thr Ser	
305 310 315 320	
agc gct tgg cgt cac ccg cag ttc ggt ggt aaa aag aaa aag taa	1005
Ser Ala Trp Arg His Pro Gln Phe Gly Gly Lys Lys Lys Lys *	
325 330	
ggatcc	1011

<210> 4
 <211> 334
 <212> PRT
 <213> HCV

<400> 4
 Met Lys Lys Lys Lys Leu Glu His His His His His His Thr Ser Ala
 1 5 10 15
 Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile Arg
 20 25 30
 Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln Met
 35 40 45
 Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His
 50 55 60
 Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala
 65 70 75 80
 Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile Ile
 85 90 95
 Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly Leu
 100 105 110
 Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala Asp
 115 120 125
 Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr
 130 135 140
 Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr
 145 150 155 160
 Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr
 165 170 175
 Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr
 180 185 190
 Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro
 195 200 205
 Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln
 210 215 220
 Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser Ser
 225 230 235 240
 Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg
 245 250 255
 Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr
 260 265 270
 Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala
 275 280 285
 Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala
 290 295 300
 Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg Thr Ser
 305 310 315 320
 Ser Ala Trp Arg His Pro Gln Phe Gly Gly Lys Lys Lys Lys
 325 330

<210> 5
 <211> 20
 <212> DNA
 <213> HCV

<400> 5
 ccattggaccg ggagatggct

<210> 6
 <211> 63
 <212> DNA
 <213> HCV

<400> 6
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 cat 63

<210> 7
 <211> 46
 <212> DNA
 <213> HCV

<400> 7
 gctcgagcat caccatcacc atcacactag tgcaggcata accaaa 46

<210> 8
 <211> 45
 <212> DNA
 <213> HCV

<400> 8
 aacaatggat ccttactttt tctttttacc accgaactgc ggggtg 45

<210> 9
 <211> 45
 <212> DNA
 <213> HCV

<400> 9
 acctgccata tgaaaaagaa aaagctcgag catcaccatc accat 45

<210> 10
 <211> 303
 <212> PRT
 <213> HCV

<400> 10
 Ala Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile
 1 5 10 15
 Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln
 20 25 30
 Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp
 35 40 45
 His Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu
 50 55 60
 Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile
 65 70 75 80
 Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly
 85 90 95
 Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala
 100 105 110
 Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala
 115 120 125
 Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu
 130 135 140

Thr Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser
 145 150 155 160
 Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp
 165 170 175
 Thr Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly
 180 185 190
 Pro Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp
 195 200 205
 Gln Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser
 210 215 220
 Ser Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg
 225 230 235 240
 Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser
 245 250 255
 Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His
 260 265 270
 Ala Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys
 275 280 285
 Ala Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
 290 295 300

<210> 11
 <211> 393
 <212> PRT
 <213> HCV

<400> 11
 Met Ala Ala Ser Cys Gly Gly Ala Val Phe Ile Gly Leu Ala Leu Leu
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 Thr Leu Ser Pro Tyr Tyr Lys Val Leu Leu Ala Arg Leu Ile Trp Trp
 20 25 30
 Leu Gln Tyr Leu Ile Thr Arg Val Glu Ala His Leu Gln Val Trp Ile
 35 40 45
 Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Ile Ile Leu Leu Thr
 50 55 60
 Cys Ala Val His Pro Glu Leu Ile Phe Asp Ile Thr Lys Leu Leu Leu
 65 70 75 80
 Ala Ile Phe Gly Pro Leu Met Val Leu Gln Ala Gly Ile Thr Lys Val
 85 90 95
 Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile Arg Ala Cys Met Leu Val
 100 105 110
 Arg Lys Ala Ala Gly Gly His Tyr Val Gln Met Ala Phe Met Lys Leu
 115 120 125
 Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu Thr Pro Leu Gln
 130 135 140
 Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val Ala Val Glu Pro
 145 150 155 160
 Val Ile Phe Ser Asp Met Glu Val Lys Ile Ile Thr Trp Gly Ala Asp
 165 170 175
 Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly Leu Pro Val Ser Ala Arg
 180 185 190
 Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala Asp Asn Phe Glu Gly Gln
 195 200 205
 Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser Gln Gln Thr Arg
 210 215 220
 Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly Arg Asp Lys Asn
 225 230 235 240

[illegible]

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<210> 12
<211> 380
<212> PRT
<213> HCV
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1				5					10					15
Ile	Trp	Trp	Leu	Gln	Tyr	Leu	Ile	Thr	Arg	Val	Glu	Ala	His	Gln
			20					25				30		
Val	Trp	Ile	Pro	Pro	Leu	Asn	Val	Arg	Gly	Gly	Arg	Asp	Ala	Ile
		35					40					45		
Leu	Leu	Thr	Cys	Ala	Val	His	Pro	Glu	Leu	Ile	Phe	Asp	Ile	Thr
	50					55					60			Lys
Leu	Leu	Leu	Ala	Ile	Phe	Gly	Pro	Leu	Met	Val	Leu	Gln	Ala	Gly
65				70						75				80
Thr	Lys	Val	Pro	Tyr	Phe	Val	Arg	Ala	Gln	Gly	Leu	Ile	Arg	Ala
			85						90				95	Cys
Met	Leu	Val	Arg	Lys	Ala	Ala	Gly	Gly	His	Tyr	Val	Gln	Met	Ala
			100					105					110	Phe
Met	Lys	Leu	Ala	Ala	Leu	Thr	Gly	Thr	Tyr	Val	Tyr	Asp	His	Leu
			115				120					125		Thr
Pro	Leu	Gln	Asp	Trp	Ala	His	Ala	Gly	Leu	Arg	Asp	Leu	Ala	Val
	130					135					140			Ala
Val	Glu	Pro	Val	Ile	Phe	Ser	Asp	Met	Glu	Val	Lys	Ile	Ile	Thr
145				150						155				160
Gly	Ala	Asp	Thr	Ala	Ala	Cys	Gly	Asp	Ile	Ile	Ser	Gly	Leu	Pro
			165						170				175	Val
Ser	Ala	Arg	Arg	Gly	Arg	Glu	Ile	Leu	Leu	Gly	Pro	Ala	Asp	Asn
			180					185				190		Phe
Glu	Gly	Gln	Gly	Trp	Arg	Leu	Leu	Ala	Pro	Ile	Thr	Ala	Tyr	Ser
		195					200					205		Gln
Gln	Thr	Arg	Gly	Leu	Leu	Gly	Cys	Ile	Ile	Thr	Ser	Leu	Thr	Gly
	210					215					220			Arg
Asp	Lys	Asn	Gln	Val	Glu	Gly	Glu	Val	Gln	Val	Val	Ser	Thr	Ala
225					230					235				240

Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val Phe
 245 250 255
 His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile Thr
 260 265 270
 Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala Pro
 275 280 285
 Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser Ser Asp Leu
 290 295 300
 Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg Gly
 305 310 315 320
 Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu Lys
 325 330 335
 Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val Gly
 340 345 350
 Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val Asp
 355 360 365
 Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
 370 375 380

<210> 13
 <211> 352
 <212> PRT
 <213> HCV

<400> 13
 Ala His Leu Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg
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 Asp Ala Ile Ile Leu Leu Thr Cys Ala Val His Pro Glu Leu Ile Phe
 20 25 30
 Asp Ile Thr Lys Leu Leu Leu Ala Ile Phe Gly Pro Leu Met Val Leu
 35 40 45
 Gln Ala Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu
 50 55 60
 Ile Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val
 65 70 75 80
 Gln Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr
 85 90 95
 Asp His Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp
 100 105 110
 Leu Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys
 115 120 125
 Ile Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser
 130 135 140
 Gly Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro
 145 150 155 160
 Ala Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr
 165 170 175
 Ala Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser
 180 185 190
 Leu Thr Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val
 195 200 205
 Ser Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys
 210 215 220
 Trp Thr Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys
 225 230 235 240
 Gly Pro Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly
 245 250 255

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Trp Gln Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly
                260                265                270
Ser Ser Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val
                275                280                285
Arg Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val
                290                295                300
Ser Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly
                305                310                315                320
His Ala Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala
                325                330                335
Lys Ala Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
                340                345                350

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<210> 14
<211> 341
<212> PRT
<213> HCV

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<400> 14
Val Arg Gly Gly Arg Asp Ala Ile Ile Leu Leu Thr Cys Ala Val His
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20         25         30
Pro Leu Met Val Leu Gln Ala Gly Ile Thr Lys Val Pro Tyr Phe Val
35         40         45
Arg Ala Gln Gly Leu Ile Arg Ala Cys Met Leu Val Arg Lys Ala Ala
50         55         60
Gly Gly His Tyr Val Gln Met Ala Phe Met Lys Leu Ala Ala Leu Thr
65         70         75         80
Gly Thr Tyr Val Tyr Asp His Leu Thr Pro Leu Gln Asp Trp Ala His
85         90         95
Ala Gly Leu Arg Asp Leu Ala Val Ala Val Glu Pro Val Ile Phe Ser
100        105        110
Asp Met Glu Val Lys Ile Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys
115        120        125
Gly Asp Ile Ile Ser Gly Leu Pro Val Ser Ala Arg Arg Gly Arg Glu
130        135        140
Ile Leu Leu Gly Pro Ala Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu
145        150        155        160
Leu Ala Pro Ile Thr Ala Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly
165        170        175
Cys Ile Ile Thr Ser Leu Thr Gly Arg Asp Lys Asn Gln Val Glu Gly
180        185        190
Glu Val Gln Val Val Ser Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys
195        200        205
Val Asn Gly Val Cys Trp Thr Val Phe His Gly Ala Gly Ser Lys Thr
210        215        220
Leu Ala Gly Pro Lys Gly Pro Ile Thr Gln Met Tyr Thr Asn Val Asp
225        230        235
Gln Asp Leu Val Gly Trp Gln Ala Pro Pro Gly Ala Arg Ser Met Thr
245        250        255
Pro Cys Thr Cys Gly Ser Ser Asp Leu Tyr Leu Val Thr Arg His Ala
260        265        270
Asp Val Ile Pro Val Arg Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu
275        280        285
Ser Pro Arg Pro Val Ser Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu
290        295        300

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Leu Cys Pro Ser Gly His Ala Val Gly Ile Phe Arg Ala Ala Val Cys
 305 310 315 320
 Thr Arg Gly Val Ala Lys Ala Val Asp Phe Ile Pro Val Glu Ser Met
 325 330 335
 Glu Thr Thr Met Arg
 340

<210> 15
 <211> 292
 <212> PRT
 <213> HCV

<400> 15
 Ala Gln Gly Leu Ile Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly
 1 5 10 15
 Gly His Tyr Val Gln Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly
 20 25 30
 Thr Tyr Val Tyr Asp His Leu Thr Pro Leu Gln Asp Trp Ala His Ala
 35 40 45
 Gly Leu Arg Asp Leu Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp
 50 55 60
 Met Glu Val Lys Ile Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly
 65 70 75 80
 Asp Ile Ile Ser Gly Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile
 85 90 95
 Leu Leu Gly Pro Ala Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu
 100 105 110
 Ala Pro Ile Thr Ala Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys
 115 120 125
 Ile Ile Thr Ser Leu Thr Gly Arg Asp Lys Asn Gln Val Glu Gly Glu
 130 135 140
 Val Gln Val Val Ser Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys Val
 145 150 155 160
 Asn Gly Val Cys Trp Thr Val Phe His Gly Ala Gly Ser Lys Thr Leu
 165 170 175
 Ala Gly Pro Lys Gly Pro Ile Thr Gln Met-Tyr Thr Asn Val Asp Gln
 180 185 190
 Asp Leu Val Gly Trp Gln Ala Pro Pro Gly Ala Arg Ser Met Thr Pro
 195 200 205
 Cys Thr Cys Gly Ser Ser Asp Leu Tyr Leu Val Thr Arg His Ala Asp
 210 215 220
 Val Ile Pro Val Arg Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser
 225 230 235 240
 Pro Arg Pro Val Ser Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu
 245 250 255
 Cys Pro Ser Gly His Ala Val Gly Ile Phe Arg Ala Ala Val Cys Thr
 260 265 270
 Arg Gly Val Ala Lys Ala Val Asp Phe Ile Pro Val Glu Ser Met Glu
 275 280 285
 Thr Thr Met Arg
 290

<210> 16
 <211> 303
 <212> PRT
 <213> HCV

<400> 16

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Ala Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile
 1              5              10              15
Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln
      20              25              30
Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp
 35              40              45
Ala Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu
 50              55              60
Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile
 65              70              75              80
Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly
      85              90              95
Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala
      100              105              110
Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala
      115              120              125
Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu
      130              135              140
Thr Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser
 145              150              155              160
Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp
      165              170              175
Thr Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly
      180              185              190
Pro Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp
      195              200              205
Gln Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser
      210              215              220
Ser Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg
 225              230              235              240
Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser
      245              250              255
Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His
      260              265              270
Ala Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys
      275              280              285
Ala Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
      290              295              300

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<210> 17
 <211> 301
 <212> PRT
 <213> HCV

<400> 17

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Ala Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile
 1              5              10              15
Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln
      20              25              30
Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp
      35              40              45

```

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His Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu
50 55 60
Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile
65 70 75 80
Ile Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Ser Gly
85 90 95
Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala
100 105 110
Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Pro Ile Thr Ala Tyr Ser
115 120 125
Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly
130 135 140
Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala
145 150 155 160
Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val
165 170 175
Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile
180 185 190
Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala
195 200 205
Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser Ser Asp
210 215 220
Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg
225 230 235 240
Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu
245 250 255
Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val
260 265 270
Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val
275 280 285
Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
290 295 300

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<210> 18

<211> 303

<212> PRT

<213> HCV

<400> 18

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Ala Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala Gln Gly Leu Ile
1 5 10 15
Arg Ala Cys Met Leu Val Arg Lys Ala Ala Gly Gly His Tyr Val Gln
20 25 30
Met Ala Phe Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp
35 40 45
His Leu Thr Pro Leu Gln Asp Trp Ala His Ala Gly Leu Arg Asp Leu
50 55 60
Ala Val Ala Val Glu Pro Val Ile Phe Ser Asp Met Glu Val Lys Ile
65 70 75 80
Ile Thr Trp Gly Ala Asp Thr Ala Ala Ala Gly Asp Ile Ile Ser Gly
85 90 95
Leu Pro Val Ser Ala Arg Arg Gly Arg Glu Ile Leu Leu Gly Pro Ala
100 105 110
Asp Asn Phe Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala
115 120 125
Tyr Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu
130 135 140

```

```

Thr Gly Arg Asp Lys Asn Gln Val Glu Gly Glu Val Gln Val Val Ser
145                               150           155           160
Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp
                               165           170           175
Thr Val Phe His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly
                               180           185           190
Pro Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp
                               195           200           205
Gln Ala Pro Pro Gly Ala Arg Ser Met Thr Pro Cys Thr Cys Gly Ser
210                               215           220
Ser Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg
225                               230           235
Arg Arg Gly Asp Ser Arg Gly Ser Leu Ser Pro Arg Pro Val Ser
                               245           250           255
Tyr Leu Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His
                               260           265           270
Ala Val Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys
275                               280           285
Ala Val Asp Phe Ile Pro Val Glu Ser Met Glu Thr Thr Met Arg
290                               295           300

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<210> 19
 <211> 11
 <212> PRT
 <213> HCV

<220>
 <221> VARIANT
 <222> (1)...(1)
 <223> Asp labeled with anthranilyl

<221> VARIANT
 <222> (6)...(6)
 <223> Xaa at position 6 is Abu

<221> VARIANT
 <222> (6)...(7)
 <223> Abu-A between 6 and 7 is C(O)-O
 <221> VARIANT
 <222> (9)...(9)
 <223> Tyr at position 9 is derivatized with 3-NO2

<400> 19
 Asp Asp Ile Val Pro Xaa Ala Met Tyr Thr Trp
 1 5 10

<210> 20
 <211> 6
 <212> PRT
 <213> HCV

<220>
 <221> VARIANT
 <222> (1)...(1)
 <223> Asp labeled with anthranilyl

<221> VARIANT
 <222> (6)...(6)
 <223> Xaa at position 6 is Abu

<400> 20
 Asp Asp Ile Val Pro Xaa
 1 5

<210> 21
 <211> 10
 <212> PRT
 <213> HCV

<400> 21
 Ser Phe Glu Gly Gln Gly Trp Arg Leu Leu
 1 5 10